



Configuring EtherChannel

This chapter describes how to use the command-line interface (CLI) to configure EtherChannel on the Catalyst 6000 family switches. The configuration tasks in this chapter apply to Ethernet, Fast Ethernet, and Gigabit Ethernet switching modules, as well as to the uplink ports on the supervisor engine.



Note

For complete syntax and usage information for the commands used in this chapter, refer to the *Catalyst 6000 Family Command Reference* publication.

This chapter consists of these sections:

- Understanding How EtherChannel Works, page 5-1
- EtherChannel Configuration Guidelines, page 5-4
- Configuring EtherChannel, page 5-4



Note

The commands in the following sections can be used on all Ethernet ports in the Catalyst 6000 family switches.

Understanding How EtherChannel Works

EtherChannel bundles individual Ethernet links into a single logical link that provides bandwidth up to 1600 Mbps (Fast EtherChannel full duplex) or 16 Gbps (Gigabit EtherChannel) between a Catalyst 6000 family switch and another switch or host.

A Catalyst 6000 family switch supports a maximum of 128 EtherChannels. You can form an EtherChannel with up to eight compatibly configured Ethernet ports on any module in a Catalyst 6000 family switch. All ports in each EtherChannel must be the same speed.



Note

The network device to which a Catalyst 6000 family switch is connected may impose its own limits on the number of ports in an EtherChannel.

If a segment within an EtherChannel fails, traffic previously carried over the failed link switches to the remaining segments within the EtherChannel. A trap is sent upon a failure identifying the switch, the EtherChannel, and the failed link. Inbound broadcast and multicast packets on one segment in an EtherChannel are blocked from returning on any other segment of the EtherChannel.

EtherChannels can be configured as trunks. After a channel has been formed, configuring any port in the channel as a trunk applies the configuration to all ports in the channel. Identically configured trunk ports can be configured as an EtherChannel.

Understanding Administrative Groups

Configuring an EtherChannel creates an administrative group, designated by an integer between 1 and 1024, to which the EtherChannel belongs. When an administrative group is created, you can assign an administrative group number or let the next available administrative group number be assigned automatically. Forming a channel without specifying an administrative group number creates a new automatically numbered administrative group. An administrative group may contain a maximum of eight ports.

Understanding EtherChannel IDs

Each EtherChannel is automatically assigned a unique EtherChannel ID. Use the **show channel group admin_group** command to display the EtherChannel ID.

Understanding Port Aggregation Protocol

The Port Aggregation Protocol (PAgP) facilitates the automatic creation of EtherChannels by exchanging packets between Ethernet ports. PAgP packets are exchanged only between ports in **auto** and **desirable** modes. Ports configured in **on** or **off** mode do not exchange PAgP packets. The protocol learns the capabilities of port groups dynamically and informs the other ports. Once PAgP identifies correctly matched EtherChannel links, it groups the ports into an EtherChannel. The EtherChannel is then added to the spanning tree as a single bridge port.

EtherChannel includes four user-configurable modes: **on**, **off**, **auto**, and **desirable**. Only **auto** and **desirable** are PAgP modes. The **auto** and **desirable** modes can be modified with the **silent** and **non-silent** keywords. By default, ports are in **auto silent** mode.

Table 5-1 describes EtherChannel modes.

Table 5-1 EtherChannel Modes

Mode	Description
on	Mode that forces the port to channel without PAgP. With the on mode, a usable EtherChannel exists only when a port group in on mode is connected to another port group in on mode.
off	Mode that prevents the port from channeling.
auto	PAgP mode that places a port into a passive negotiating state, in which the port responds to PAgP packets it receives but does not initiate PAgP packet negotiation. (Default)
desirable	PAgP mode that places a port into an active negotiating state, in which the port initiates negotiations with other ports by sending PAgP packets.

Table 5-1 EtherChannel Modes (continued)

Mode	Description
silent	Keyword that is used with the auto or desirable mode when no traffic is expected from the other device to prevent the link from being reported to the Spanning-Tree Protocol as down. (Default)
non-silent	Keyword that is used with the auto or desirable mode when traffic is expected from the other device.

Both the **auto** and **desirable** modes allow ports to negotiate with connected ports to determine if they can form an EtherChannel, based on criteria such as port speed, trunking state, and VLAN numbers.

Ports can form an EtherChannel when they are in different PAgP modes as long as the modes are compatible. For example:

- A port in **desirable** mode can form an EtherChannel successfully with another port that is in **desirable** or **auto** mode.
- A port in **auto** mode can form an EtherChannel with another port in **desirable** mode.
- A port in **auto** mode cannot form an EtherChannel with another port that is also in **auto** mode, since neither port will initiate negotiation.

Understanding Frame Distribution

EtherChannel distributes frames across the links in a channel by reducing part of the binary pattern formed from the addresses in the frame to a numerical value that selects one of the links in the channel.

Enter a **show module** command for the supervisor engine to determine if EtherChannel frame distribution is configurable on your switch.

- If the display shows the “Sub-Type” to be “L2 Switching Engine I WS-F6020,” then EtherChannel frame distribution is not configurable on your switch; it uses source and destination MAC addresses.
- EtherChannel frame distribution is configurable with all other switching engines. The default is to use source and destination IP addresses.

When configurable, EtherChannel frame distribution can use either MAC addresses or IP addresses and either source or destination or both source and destination addresses. The selected mode applies to all EtherChannels configured on the switch.

Use the option that provides the greatest variety in your configuration. For example, if the traffic on a channel is only going to a single MAC address, using the destination MAC address always chooses the same link in the channel; using source addresses or IP addresses may result in better frame distribution.

EtherChannel Configuration Guidelines

If improperly configured, some EtherChannel ports are disabled automatically to avoid network loops and other problems. Follow these guidelines to avoid configuration problems:

- Assign all ports in an EtherChannel to the same VLAN, or configure them as trunk ports.
- If you configure the EtherChannel as a trunk, configure the same trunk mode on all the ports in the EtherChannel. Configuring ports in an EtherChannel in different trunk modes can have unexpected results.
- An EtherChannel supports the same allowed range of VLANs on all the ports in a trunking EtherChannel. If the allowed range of VLANs is not the same for a port list, the ports do not form an EtherChannel even when set to the **auto** or **desirable** mode with the **set port channel** command.
- Ports with different port path costs, set by the **set spantree portcost** command, can form an EtherChannel as long they are otherwise compatibly configured. Setting different port path costs does not, by itself, make ports incompatible for the formation of an EtherChannel.
- Do not configure the ports in an EtherChannel as dynamic VLAN ports. Doing so can adversely affect switch performance.
- An EtherChannel will not form with ports that have different GARP VLAN Registration Protocol (GVRP), GARP Multicast Registration Protocol (GMRP), and quality of service (QoS) configurations.
- Configure all ports in an EtherChannel to operate at the same speed and duplex mode.
- An EtherChannel will not form with ports where the port security feature is enabled.
- You cannot enable the port security feature for ports in an EtherChannel.
- An EtherChannel will not form if one of the ports is a SPAN destination port.
- An EtherChannel will not form if protocol filtering is set differently on the ports.
- Enable all ports in an EtherChannel. If you disable a port in an EtherChannel, it is treated as a link failure and its traffic is transferred to one of the remaining ports in the EtherChannel.

Configuring EtherChannel

These sections describe how to configure EtherChannel:

- Configuring an EtherChannel, page 5-5
- Setting the EtherChannel Port Mode, page 5-5
- Setting the EtherChannel Port Path Cost, page 5-5
- Setting the EtherChannel VLAN Cost, page 5-6
- Configuring EtherChannel Frame Distribution, page 5-7
- Disabling EtherChannel, page 5-7



Note

Make sure that the ports are configured correctly. (See the “EtherChannel Configuration Guidelines” section on page 5-4.)

Configuring an EtherChannel

To configure EtherChannel on a group of Ethernet ports, perform this task in privileged mode:

Task	Command
Configure the EtherChannel on the desired ports.	set port channel <i>mod/ports...</i> [<i>admin_group</i>] set port channel <i>mod_num/port_num mode</i> { on off desirable auto } [silent non-silent]

This example shows how to configure a seven-port EtherChannel in a new administrative group:

```
Console> (enable) set port channel 2/2-8 desirable
Ports 2/2-8 left admin_group 1.
Ports 2/2-8 joined admin_group 2.
Console> (enable)
```

Setting the EtherChannel Port Mode

To set a port's EtherChannel mode, perform this task in privileged mode:

Task	Command
Set a port's EtherChannel mode.	set port channel <i>mod/ports...</i> [<i>admin_group</i>] set port channel <i>mod_num/port_num mode</i> { on off desirable auto } [silent non-silent]

This example shows how to set port 2/1 to **auto** mode:

```
Console> (enable) set port channel 2/1 mode auto
Ports 2/1 channel mode set to auto.
Console> (enable)
```

Setting the EtherChannel Port Path Cost

To set the EtherChannel port path cost, perform this task in privileged mode:

	Task	Command
Step 1	Use the administrative group number to display the EtherChannel ID.	show channel group <i>admin_group</i>
Step 2	Use the EtherChannel ID to set the EtherChannel port path cost.	set channel cost { <i>channel_id</i> all } <i>cost</i>

This example shows how to set the EtherChannel port path cost for channel ID 768:

```

Console> (enable) show channel group 20
Admin Port  Status      Channel  Channel
group       Mode        id
-----
   20    1/1 notconnect on          768
   20    1/2 connected on          768

Admin Port  Device-ID                               Port-ID           Platform
group
-----
   20    1/1
   20    1/2 066510644 (cat26-lnf (NET25))    2/1              WS-C6009
Console> (enable)

Console> (enable) set channel cost 768 12
Port(s) 1/1,1/2 port path cost are updated to 31.
Channel 768 cost is set to 12.
Warning:channel cost may not be applicable if channel is broken.
Console> (enable)

```

Setting the EtherChannel VLAN Cost

To set the EtherChannel VLAN cost, perform this task in privileged mode:

	Task	Command
Step 1	Use the administrative group number to display the EtherChannel ID.	show channel group <i>admin_group</i>
Step 2	Use the EtherChannel ID to set the EtherChannel VLAN cost.	set channel vlancost <i>channel_id cost</i>

This example shows how to set the EtherChannel VLAN cost for channel ID 768:

```

Console> (enable) show channel group 20
Admin Port  Status      Channel  Channel
group       Mode        id
-----
   20    1/1 notconnect on          768
   20    1/2 connected on          768

Admin Port  Device-ID                               Port-ID           Platform
group
-----
   20    1/1
   20    1/2 066510644 (cat26-lnf (NET25))    2/1              WS-C6009
Console> (enable)

Console> (enable) set channel vlancost 768 12
Channel 768 vlancost set to 12.
Console> (enable)

```

Configuring EtherChannel Frame Distribution

To configure EtherChannel frame distribution, perform this task in privileged mode:

Task	Command
Configure EtherChannel frame distribution.	set port channel all distribution {ip mac} [source destination both]

This example shows how to configure EtherChannel to use MAC source addresses:

```
Console> (enable) set port channel all distribution mac source  
Channel distribution is set to mac source.  
Console> (enable)
```

Disabling EtherChannel

To disable an EtherChannel, perform this task in privileged mode:

Task	Command
Disable an EtherChannel.	set port channel <i>mod_num/port_num</i> mode off

This example shows how to disable an EtherChannel:

```
Console> (enable) set port channel 2/2-8 mode off  
Ports 2/2-8 channel mode set to off.  
Console> (enable)
```

